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What drives end-of-life financial decisions? An analysis of aged care accommodation payments in Australia.

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Abstract

Asset-holding and optimal financial decision-making permits greater independence and choice around consumption, health and aged care in old age. However, many older people require help with financial decisions due to cognitive and functional impairments. Choosing an accommodation payment type when entering residential aged care in Australia is complex and subject to potentially competing interests from service providers and informal carers. The payment type chosen can impact a resident's consumption and wealth, and the bequest left to family and informal carers. It can also impact a provider's financial sustainability, and its ability to fund care services and capital expenditure. To understand the influence of different groups on decision-making, we evaluated the associations between resident, informal carer and provider characteristics and the accommodation payment decision by analysing survey data from 581 informal carers who substantially helped residents choose an accommodation payment type between 2016 to 2020. We found the resident's financial situation and care circumstances constrained their choice set. Informal carer characteristics were associated with the payment decision, including their emotive perceptions of the decision, which may indicate the use of simplifying heuristics. Provider preferences were strongly associated with the payment decision, suggesting a potential principal-agent problem. We discuss public policy approaches that could help improve financial decisions in the face of these issues and decision complexity.

JEL classification: D14, G41, G51, I18

Key words: Aged care, complex financial decision, asset management, wealth, incentives

Introduction

Population ageing and increasing life expectancy in developed countries has shifted government attention to how older individuals finance their consumption, health and aged care, and maintain their standards of living in the post-retirement period.

Over the last two decades, the proportion of Australians aged 65 years and over increased from 12% to 16%, with accelerated increases expected over the next decade as baby boomers age (Australian Bureau of Statistics, 2019). Expenditure on aged care in Australia is projected to increase from 1.2% of gross domestic product in 2021-22 to 2.1% by 2060-61 (Commonwealth of Australia, 2021).

Many older Australians hold high asset values, particularly in the form of residential properties (Productivity Commission, 2015). While high asset values may permit greater independence and lifestyle choices, cognitive and functional impairments and aged care system complexity result in many individuals requiring help with asset management and financial decision-making.

Financial decisions in old age are therefore often undertaken by, or with substantial help from, an informal carer such as a partner or child (Aged Care Financing Authority, 2018; Tilse et al., 2011). Financial decision-making is complicated as informal carers and providers may have competing interests in the management and use of the significant assets owned by older individuals (Tilse et al., 2005).

While the Australian Government is increasingly encouraging self-funding and the mobilisation of assets to improve post-retirement quality of life (Productivity Commission, 2015), older individuals may instead be more motivated by subjective reasons or bequest expectations in making financial decisions (Hutchison, 2012; Tilse et al., 2005). There are concerns around the potential misuse of assets by informal carers and substitute decision-makers, and the financial complexities of residential aged care admission in Australia which further complicate decision-making (Setterlund et al., 2002; Tilse et al., 2011).

At the same time, the financial position of residential aged care providers has deteriorated, compounded by the COVID-19 pandemic (Aged Care Financing Authority, 2020). Recent volatility and margin pressure has halted the investment plans of many providers and created substantial uncertainty. Providers want to protect their solvency, which is partly dependent on how their residents pay for accommodation.

In Australia, most people in residential aged care pay for their accommodation. Choosing an accommodation payment type is an important and complex decision within the subset of end-of-life financial decisions undertaken in old age. This subset includes retirement planning and investment portfolio decisions (Van Rooij et al., 2012), management of superannuation funds (Earl et al., 2015), allocation of pension income to consumption and saving (Gallery et al., 2011) and decisions on whether to hold or sell housing in old age (Productivity Commission, 2015).

Aged care residents can pay using a lump-sum payment known as a refundable accommodation deposit (RAD), a payment option unique to Australia. A RAD is returned to the resident or estate on leaving care. Alternatively, residents can pay for their accommodation using a daily accommodation payment (DAP), which is a rental-style interest payment, or can pay using any combination of RAD and DAP.

Different payment choices can impact the resident's consumption, wealth and bequest values and therefore can impact other end-of-life financial decisions. Payment preferences and preference shifts can also impact service providers' insolvency risk. Aged care providers use RADs to finance

capital expenditure on renovations and building new facilities (Aged Care Financing Authority, 2020).

Providers held $30.2 billion in RADs on their balance sheets as of 30 June 2019, with most used for capital expenditure (Aged Care Financing Authority, 2020). Despite their heavy reliance on RADs, providers are legislated to not control the resident's accommodation payment decision. The Australian Government is also exposed to shifts in accommodation payment choice that impact provider solvency since it guarantees that every resident will receive their RAD back when leaving a facility.

To explore the potential influence of these groups on this end-of-life financial decision, we evaluated the associations between resident, informal carer and provider characteristics with the accommodation payment decision.

We used survey data collected in 2020 from 581 informal carers who substantially helped residents make an accommodation payment decision between 2016 and 2020. We employed multinomial logistic regression to assess the choice between a RAD, DAP or combination of both, and modelled the association between characteristics and the proportion RAD within the accommodation payment using fractional logistic regression.

Select resident, informal carer and provider characteristics were found to be significantly associated with the accommodation payment decision, suggesting that all three parties directly or indirectly influence this decision. We found a resident with less financial means prior to entering residential aged care is constrained from choosing RAD payment. Resident care circumstances, including moving to residential aged care from hospital may constrain the ability to choose a RAD.

Informal carer characteristics were significantly associated with the payment decision, including demographic characteristics, educational attainment, appetite for investment risk, help-seeking, and emotive perception of the decision-making process.

This new evidence suggests informal carers may significantly influence the payment decision, both directly by their guidance and indirectly by their characteristics. The significant association between emotive characteristics (e.g. stress experienced by the carer), and the payment decision suggests decision complexity and potential use of heuristics or subjective factors when deciding (Cutler et al., 2021; DellaVigna, 2009; Gabaix et al., 2006; Porcelli and Delgado, 2009).

Providers expressing a preference for a certain accommodation payment type was significantly associated with RAD payment and higher RAD proportions within a combination payment. This is striking, suggesting there may be a potential principal-agent problem and providers may be influencing the decision, given their reliance on RADs for capital expenditure.

Only two past empirical studies have analysed aged care accommodation payment decisions in Australia (Abiona et al., 2020; Cutler et al., 2021a). These studies analysed administrative data on residents and facilities but did not explore detailed individual, contextual and provider-level characteristics, and the potential for groups besides residents to influence this decision.

The self-reported data collected in our study are rich in individual-level detail on both residents and their informal carers, including assessed financial literacy (Lusardi and Mitchell, 2011) and feelings towards decision-making, which acted as process predictors in the estimations. We also assessed the association between provider preferences and accommodation payment decisions, an aspect that has not been analysed in any past studies.

Our study also contributes to the broader literature on competing interests in end-of-life financial decisions (Berheim, 1991; Hamilton and Menezes, 2011; Horioka et al., 2017; Johar et al., 2015; Tilse et al., 2005, 2007) and the complexity of aged care decision-making in Australia (Cutler et al., 2021; Edwards et al., 2003; Hamilton and Menezes, 2011; Phillipson et al., 2019). We discuss

the potential reasons behind our findings and outline public policy approaches that could assist better financial decision-making for older Australians.

Institutional background

Approximately 60,000 people enter residential aged care in Australia each year (Aged Care Financing Authority, 2020). In 2018-19, the residential aged care sector comprised 873 residential aged care providers, who managed 2,717 facilities and 213,397 operational beds. Not-for-profit providers operated 56 per cent of beds, while for-profit providers operated 33 per cent. State-owned providers made up the remainder (Aged Care Financing Authority, 2020).

The Australian Government subsidises some aged care residents. Fully-supported residents, who make up around half of all residents, do not pay for their care services or accommodation. Partially-supported residents pay some accommodation costs, while unsupported residents pay for all their accommodation costs and some also pay for care services.

A resident requires approval from a government-funded aged care assessment to gain access to a subsidised bed. Assessment is based on perceived need, while the amount of subsidy is determined using a means test. All assets and income sources are included, although the value of the prior home is capped (at $171,535 in March 2021). If a protected person (e.g., partner, child, or carer) is still living at the prior home, the value of the home is excluded from the asset test (Aged Care Financing Authority, 2020).

Providers set accommodation prices, but these are correlated with local housing prices, with facilities in capital cities having high accommodation prices. Providers must seek approval from the Aged Care Pricing Commissioner to charge consumers more than $550,000 (Australian Government, 2021). The Commissioner assesses rooms for value by comparing the requested price to the estimated land and building cost, along with facility fit-out, furnishing and equipment.

Accommodation prices must be published as a RAD, DAP or any combination of both. DAPs are priced from RADs using an algorithm and the maximum permissible interest rate (MPIR) legislated by the Australian Government (Department of Health, 2021):

$$DAP = [RAD\ (\$) \times MPIR\ (\%)]/365 = Payment\ per\ day\ (\$)$$

The MPIR is recalculated quarterly based on market interest rates for bank bills. Consequently, even if the RAD price remains the same, the DAP price changes as interest rates change.

Consumers have 28 days to decide their accommodation payment choice upon entering a residential aged care facility. Unless a RAD is chosen within these 28 days, the default payment is a DAP. Consumers who choose full or part RAD payment have six months to pay, with accommodation charged as a DAP in the meantime (Department of Health, 2021). Choosing a RAD can affect other aged care service fees, as the value of the RAD is counted as an asset in aged care means assessments (Australian Government, 2021a).

Providers invest RADs in permitted uses legislated by the Australian Government and cannot use RADs to cover operational costs. Most RADs are used for building renovations or building new facilities. RADs represent a relatively cheap form of debt for providers and may represent the only debt option for providers that cannot access commercial debt, such as small providers or those with a relatively poor management structure or financial outlook. Most RADs not used for capital expenditure are kept in provider deposit accounts, with providers using investment returns to cover operational costs (Cutler et al., 2021a).

A recent survey of residential aged care providers found 45 per cent of providers preferred a RAD or combination payment (Cutler et al., 2021a). However, providers cannot offer financial advice to

consumers unless they hold a financial advice license. Some providers may try to direct consumers towards choosing a RAD by focusing accommodation payment discussions on RADs. Other providers may offer fee discounts if a consumer chooses a RAD (Cutler et al., 2021a).

Complexity and utility maximisation in the accommodation payment decision

Under a utility maximisation framework (Neumann and Morgenstern, 1953) with rational agents and perfect information, a resident will choose the accommodation payment type expected to maximise their utility, relative to all other payment choices within an infinite RAD and DAP choice set (including, at the extreme 100% RAD or 100% DAP), subject to their budget constraint.

Under a simplified two-period framework, consumers with rational preferences derive utility (U) from their current consumption of goods and services (including aged care) in period 1 (C_1) and future consumption in period 2 (C_2) (Fisher, 1930; Fama, 1970). Individuals enter residential aged care in period 1 and exit residential aged care at the end of period 2. In addition to their own consumption, aged care residents may also derive utility from the bequest value left to family at the end of period two (W_2) (Kopczuk and Lupton, 2007).

The utility of future consumption is discounted at rate 'ρ', the rate of time preference for a given individual (Fisher, 1930). Higher values of 'ρ' imply less satisfaction derived from future consumption relative to current consumption. The importance placed on the expected bequest value is represented by the weight ∂:

$$U = F\left[(C_1), \frac{(C_2)}{(1+\rho)}, \partial(W_2)\right] \quad \text{.....(1)}$$

First-period consumption (C_1) comprises expenditure on aged care (AC_1) and other consumption (OC_1) including expenditure on personal goods, regular health care and expenditure on health shocks:

$$C_1 = AC_1 + OC_1 \quad \text{.....(2)}$$

Total expenditure on aged care in period 1 (AC_1) has four components; the accommodation payment (P_{j1}), means-tested aged care service fees (F_{j1}), associated with accommodation payment type j (where j = *RAD, DAP or combination*), basic daily fees (DF_1) and hotel-style extra services (ES_1). First-period consumption is constrained by the resident's current income (Y_1) and assets (L_1). Hence, the first-period budget constraint is:

$$OC_1 + P_{j1} + F_{j1} + DF_1 + ES_1 + W_1 = [Y_1 + L_1] \text{ .....(3)}$$

Here, W_1 represents any residual wealth after period 1 expenditure:

$$W_1 = [Y_1 + L_1] - OC_1 - P_{j1} - F_{j1} - DF_1 - ES_1 \text{ .....(4)}$$

Residual wealth (W_1) after the first period carries over into the second period budget constraint and earns a return associated with investment type k (r_k).

$$OC_2 + W_2 = [Y_2 + (1 + r_k)W_1] - P_{j2} - F_{j2} - DF_2 - ES_2 \text{ ..... (5)}$$

After the second-period, any residual wealth still left over represents the bequest value (W_2) left to the resident's family:

$$W_2 = [Y_2 + (1 + r_k)W_1] - P_{j2} - F_{j2} - DF_2 - ES_2 - OC_2 \text{ ..... (6)}$$

Substituting (3) into (5) gives the intertemporal budget constraint:

$$OC_1 + P_{j1} + F_{j1} + DF_1 + ES_1 + \frac{OC_2 + P_{j2} + F_{j2} + DF_2 + ES_2}{1+r_k} = Y_1 + L_1 + \frac{Y_2 - W_2}{1+r_k} \quad \text{..... (7)}$$

This theoretical framework illustrates two important points. First, the accommodation payment choice is constrained by the resident's budget constraint so some residents will be better-equipped to choose a RAD than others. Second, the chosen accommodation payment type influences a resident's current and future consumption and the bequest value leftover at the end of the two periods. Since different RAD, DAP and combination payments lead to different sized outflows in current and future periods and different rates of return on wealth, they are associated with differential impacts on consumption and wealth for residents over time.

Financial constraints on the accommodation payment decision

Within this framework, resident income and assets in the first period (L_1, Y_1 in (3)) act as constraints on the accommodation payment choice. If resident assets in the first period (net of age care expenditure and other consumption) are less than a lump-sum outflow required for RAD or part-RAD payment, this would inhibit the ability of the resident to choose these payment options.

Hence, residents owning residential property or other valuable assets may have greater access to funds through asset liquidation, and be more able to choose full or part-RAD payment. Residents owning residential property in higher-priced locations may have access to relatively greater funds from a house sale, which would increase the ability to choose these payment options. However, room prices are positively correlated with housing prices, which may weaken this ability.

Access to funds may also be influenced by the presence of a partner or child at home, as this may inhibit the resident's ability to sell their home and choose a RAD or part-RAD payment. Since house sale requires significant time investment and planning, residents under time pressure (e.g. those entering care after a sudden health shock) may also be inhibited from converting residential property to funds and choosing a RAD or part-RAD payment within the six months required, or before the resident dies.

Lastly, DAP choice may also be constrained by access to income and assets. If a resident does not have sufficient income in both periods (Y_1, Y_2) or sufficient assets (W_1) to draw down on to cover DAP payments, they may be inhibited from choosing this payment option. These residents may be more likely to pay a combination payment consisting of a lump-sum and DAP payment that fits their budget constraint.

Resident utility from the accommodation payment decision and interdependencies within the budget constraint

Maximising the utility function (1) subject to the intertemporal budget constraint (7) gives expressions for optimal consumption levels (C_1^*, C_2^*) in both periods and the optimal bequest value (W_2^*) for a given aged care resident, with the specific expression depending on the formulation of the utility function (1).

Choosing consumption levels in each period which maximise utility (1) would depend on the resident's rate of time preference for consumption (ρ) relative to the expected rate of return on wealth (r_k). The optimal bequest value would depend on the resident's preference for leaving a bequest (∂) and the expected rate of return on wealth (r_k).

$$U^* = F\,[C_1^*, C_2^*, W_2^*]$$

$$C_{1,2}^* = F\,[\rho, r_k]$$

$$W_2^* = F\,[\partial, r_k]$$

The accommodation payment choice ($P_{j1,2}$) influences funds available for other aged care expenditure ($F_{j1,2}, DF_{1,2}, ES_{1,2}$) and other consumption ($OC_{1,2}$) in both periods, savings left over after the first period (W_1), the potential rate of return on these (r_k), and ultimately, the bequest value left at the end of two periods (W_2).

The accommodation payment choice may consequently also be an investment decision, depending on the weight placed by the resident on leaving a bequest value. The payment type chosen influences the return, r_k, earned on first period savings/assets (W_1). Residents who sell their house to pay for a RAD or part-RAD effectively change their investment portfolio mix, 'disinvesting' in housing and 'investing' in aged care. The new portfolio return is therefore dictated by the weighted rate of return from portfolio assets, which includes the return from RADs (represented by the DAP avoided divided by the RAD).

However, residents will also have leftover funds after their RAD payment to be invested elsewhere as providers must leave a minimum level of assets when seeking a RAD and they are constrained on the maximum level of RAD they can ask from a resident. How residents invest these leftover funds will influence the return (r_k) earned on assets, and therefore consumption.

The budget constraints are not fixed and are also influenced by the accommodation payment type chosen, while total aged care expenditure is determined by means tests, indicating the complexity of this decision-making context and interdependencies between different components.

Some components of aged care expenditure are means-tested (i.e. the accommodation payment, $P_{j1,2}$, and aged care service fees, $F_{j1,2}$) while others are not (basic daily fees, $DF_{1,2}$, and hotel-style service costs, $ES_{1,2}$). Whether a resident is Commonwealth-subsidised for the accommodation payment ($P_{j1,2}$) depends on the resident's level of assets and income on entering aged care (Y_1 , L_1), as well as their relationship status and prior living situation (homeownership). A capped value for the resident's prior home is included within this means test, unless there is still a partner, child or carer living at the home (Aged Care Financing Authority, 2020).

This means test is also applied to aged care service fees. The payment type chosen can therefore influence aged care service fees ($F_{j1,2}$) as it can determine whether a person keeps their home. If a resident sells their home and chooses RAD payment, for example, the RAD and remaining balance is counted as an asset in the means assessment that determines care fees, whereas if a resident chooses a DAP and keeps their home, the value of the home in the means assessment is capped (Australian Government, 2021).

The payment type chosen also influences pension income and other government income support received (Y_1, Y_2) in the first and second periods. A different means test applies to pension payments, which excludes the value of the prior home within assets for up to two years after entering care (if no one is left at home) but considers homeownership in setting specific asset test thresholds.

If a partner, child or carer lives within the home, the prior home remains exempt from the assets test. RAD amounts are excluded from pension assessments, but leftover proceeds from the house sale may be counted as assets and used to determine deemed income in these assessments (Department of Veteran Affairs, 2021; 2021a).

In the face of these different means-testing arrangements, some residents may be incentivised to keep their home to reduce their aged care fees or maximise their pension income. Those with partners or children at home may have greater access to pension income, due to the exclusion of the family home from the pensions means test.

Ultimately, different accommodation payment choices are associated with different levels of utility to the resident. With perfect information and rational decision-making, the theoretical framework

predicts a resident would choose the payment type associated with the highest utility, subject to constraints.

Barriers to resident utility maximisation: decision complexity and informal carer and provider influence

The above discussion assumes that the accommodation payment decision is made to maximise the aged care resident's utility. In reality, the accommodation payment decision is often undertaken by, or with substantial help from, an informal carer (Aged Care Financing Authority, 2018).

An informal carer may act as a perfect agent for the resident and be motivated by altruistic concerns for maximising the resident's utility (Altonji et al., 1997; Perozek, 1998; Sloan et al., 1997). However, some informal carers may be motivated by a strategic bequest motive (Berheim, 1991; Horioka et al., 2017; Johar et al., 2015) and exert influence on the payment decision to maximise bequest value (W_2), at the expense of the resident's utility or preferences, or inhibit house sale to maintain access to the family home.

Even if informal carers do not seek to maximise their own utility, their involvement in decision-making may mean their own characteristics (e.g. investment risk-taking, financial literacy) inevitably influence the accommodation payment choice, which may inhibit optimal decision-making from the resident's perspective. There is evidence to suggest many informal carers acting as agents to help residents make an accommodation payment decision in Australia have poor financial literacy (Cutler et al., 2021).

As this theoretical framework demonstrates, choosing an accommodation payment type is a complex decision with interdependencies and interactions between different means-testing arrangements. Optimisation requires decisions around whether to hold or sell residential property, judgements around returns from investing in different asset types, impacts on income and other aged care fees, expected future consumption of the resident, and the potential bequest value.

In the face of this complexity, residents and their informal carers may simplify complex decisions by ignoring complex information or being myopic (Gabaix et al., 2006). Simplifying decision heuristics may also be employed by residents and informal carers, such as choosing a default payment option (DellaVigna, 2009).

Residential aged care providers have also their own preferences regarding payment type. Aged care providers may prefer RAD or part-RAD payments, which allow them to undertake additional capital expenditure (Cutler et al., 2021). If a principal-agent relationship exists, providers may take advantage of decision complexity by encouraging residents and informal carers to choose RADs, at the expense of maximising the resident's utility.

Overall, utility maximisation in this decision-making context may be hindered by substantial decision complexity and due to the competing interests of providers and informal carers (family members).

Data

Survey design and timing

We conducted an online survey of informal carers who acted as an agent to help residents make the accommodation payment decision between January 2016 to August 2020. Informal carers were recruited online and surveyed over June to August 2020.

Informal carers were screened based on the person they cared for (the resident) being a permanent resident of a facility (e.g. not in respite care) and being required to make an accommodation

payment (be either non-supported or partially Commonwealth-supported for payment). Informal carers were also required to have been significantly involved in the accommodation payment decision and have a good understanding of the resident's financial circumstances when they entered care. This was determined through a set of screening questions at the survey start.

The survey included questions on accommodation payment type chosen (RAD, DAP, combination) and percentage component RAD in combination payments. It also asked questions on resident and informal carer demographic characteristics, resident socioeconomic characteristics, assistance with the accommodation payment decision, and perceived difficulties faced when making the decision. Questions on provider involvement with the accommodation payment decision, care circumstances of the resident and financial literacy of the informal carer were also included in the survey.

Some survey questions were sourced from the 2018 ACFA consumer survey on financing aged care (Aged Care Financing Authority, 2018) and the *'Residential Aged Care – Calculation of your cost of care (SA457)'* form, available on the Services Australia website (Services Australia, 2020). The survey questions were refined after consultations with representatives from the Department of Health and aged care peak bodies. The survey was piloted in two face-to-face focus groups consisting of 10 participants, which resulted in wording changes.

In total, 653 informal carers completed the survey. Informal carers in the lowest tenth percentile for time taken to complete the survey were dropped from all analyses due to these being 'speeders' who completed the survey in a time of approximately 9 minutes or less. This time was deemed inadequate for accurately answering the detailed survey questions, based on a focus group held on the survey before making it public. These informal carers also had a high proportion of implausible responses to survey questions.

After excluding speeders, 550 informal carers had sufficient data for the fractional logistic regression analysing RAD proportions, and 581 informal carers had sufficient data for the multinomial logistic regression analysing the choice between a RAD, DAP or combination payment. To assess the impact on results from a potential non-random partial survey completion, we conducted a sensitivity analysis by performing these estimations with larger samples of 638 (fractional logistic) and 678 (multinomial logistic) informal carers derived from imputing values for missing covariates of interest (**Appendix Section A2**).

Summary statistics: payment decision and sample characteristics

Of the 581 informal carers in the multinomial logistic regression sample, 48.7% reported RAD as a payment choice, 30.0% reported DAP, and 21.3% reported a combination payment of RAD and DAP. Our sample averages are close to national data averages. National data on aged care residents indicates 47% of non-Commonwealth supported residents chose RAD while 27% chose DAP, averaged over 2016-2019 (Aged Care Financing Authority, 2020).

Figure 1 presents the percentage RAD chosen within payments that combined RADs and DAPs in the sample (n=124). There is a spike at the RAD percentage of 50%, suggesting around one-quarter of people in the combination payment sample split the payment equally between RAD and DAP. This peak is consistent with the pattern in national administrative data on combination payments (Cutler et al., 2021).

Table 1 presents the mean characteristics of the informal carer sample across the three accommodation payment types. The mean ages of residents and informal carers in the sample were 82.5 years and 53.3 years, respectively. On average, residents for whom DAP payment was chosen were slightly younger than residents for whom RAD and combination payments were chosen. These residents were also less likely to own their home or hold additional residential property prior

to entering residential aged care. This aligns with identified financial barriers to choosing RAD within the theoretical framework.

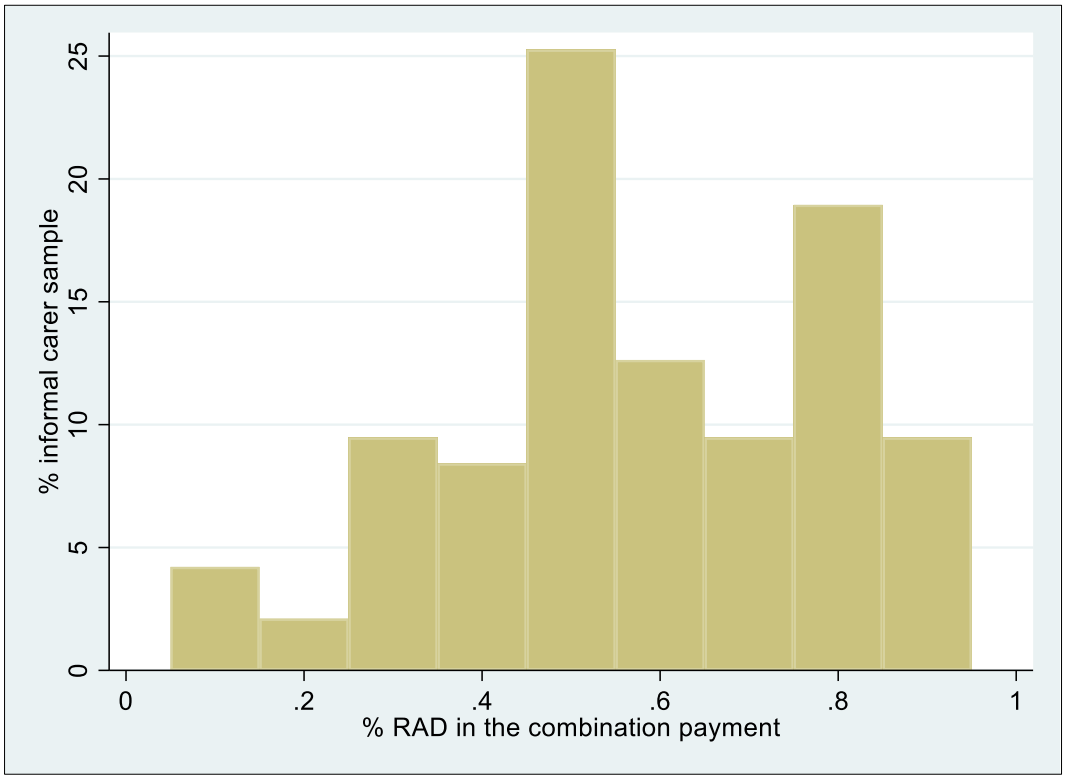

Figure 1: % RAD in combination payments

The data also align with other potential barriers to RAD payment. Residents for whom RAD or combination payments were chosen were less likely to have a partner or child living at home. Conversely, residents for whom DAP was chosen were more likely to have moved to the facility from hospital than the other payment types, suggesting these types of residents chose to remain with the 'default' payment type.

The financial literacy and risk-taking attitude of informal carers varied across payment type. To estimate financial literacy, we derived measures from the 'Big Three questions' validated financial literacy measure used in past literature (Agnew et al, 2013). The overall level of financial literacy in the sample, measured by informal carers answering all three questions correctly, was 48%. Informal carers reporting DAP payment had the highest financial literacy (51% with all three correct), while informal carers reporting RAD payment had the lowest (46% with all three correct).

Informal carers reporting a RAD payment were more likely to report taking substantial or above average investment risks with spare cash (29%), as compared to those reporting DAP (18%) and combination payment (22%). Those reporting RAD and combination payments were more likely to have consulted a financial advisor. Informal carers reporting combination payments were most likely to report the decision being complex (70%) and stressful (64%), compared to the other two payment types. Informal carers choosing RAD were also most likely to report the aged care provider had expressed a payment type preference.

Table 1: Estimation sample characteristics, by accommodation payment type

Payment type	*Total (N=581)*	*RAD (N=283)*	*DAP (N=174)*	*Combination (N=124)*
Variable	***Mean***	***Mean***	***Mean***	***Mean***
Resident demographic characteristics				
Age (years)	82.515	82.823	80.937	84.024
Male	0.348	0.311	0.402	0.355
Single	0.809	0.837	0.753	0.823
Resident care circumstances				
Partner or child left at home	0.148	0.113	0.218	0.129
Moved from a hospital to facility	0.361	0.318	0.431	0.363
Resident financial situation				
Owned residence prior to residential aged care	0.687	0.710	0.609	0.742
Owned >1 residential properties	0.108	0.117	0.080	0.129
Received government income support prior to residential aged care	0.549	0.459	0.638	0.629
Commonwealth-supported for accommodation	0.571	0.452	0.736	0.613
Informal carer demographic characteristics				
Age (years)	53.275	53.290	52.098	55.363
Male	0.375	0.378	0.397	0.339
English-speaking	0.952	0.940	0.966	0.960
Informal carer - highest educational attainment				
Year 12 or below	0.215	0.201	0.224	0.234
Certificate/diploma	0.325	0.350	0.287	0.323
Tertiary degree	0.460	0.449	0.489	0.444
Informal carer's relation to resident				
Spouse	0.026	0.025	0.040	0.008
Child	0.491	0.488	0.425	0.589
Sibling	0.033	0.028	0.046	0.024
Friend	0.200	0.212	0.195	0.177
Nephew or niece	0.067	0.060	0.086	0.056
Other[(a)]	0.184	0.187	0.207	0.145
Financial literacy and risk-taking				
Informal carer - financial literacy (All 'Big Three' questions correct)	0.484	0.463	0.511	0.492
Informal carer reports taking above average/substantial investment risks	0.244	0.293	0.184	0.218
Reported factors considered in decision-making:				
Access to cash	0.444	0.420	0.431	0.516
Access to assets	0.341	0.318	0.345	0.387
Impact on resident wealth	0.296	0.272	0.351	0.274
Interest rate	0.122	0.106	0.126	0.153
Resident's expected length of stay	0.301	0.283	0.310	0.331
Home inheritance concerns	0.413	0.413	0.425	0.395
Impact on other residential aged care fees	0.494	0.449	0.506	0.581
Not wanting to have an outstanding debt	0.265	0.286	0.241	0.250
Perception of decision-making process:				
Understood decision - difference between RAD and DAP	0.843	0.859	0.810	0.855
Found the decision complex	0.597	0.544	0.615	0.694
Found the decision stressful	0.542	0.523	0.500	0.645
Sources of help used to assist decision-making:				
Consulted financial advisor	0.353	0.375	0.293	0.387
Consulted online information	0.711	0.703	0.736	0.694
Provider characteristics				
Facility expressed payment type preference	0.480	0.530	0.397	0.484

Payment type	*Total (N=581)*	*RAD (N=283)*	*DAP (N=174)*	*Combination (N=124)*
Variable	***Mean***	***Mean***	***Mean***	***Mean***
Aged care informed decision-maker about 28-day decision-making period	0.542	0.537	0.529	0.573
Regional characteristics of facility				
Metro area	0.699	0.696	0.690	0.718
Inner-regional area	0.189	0.212	0.178	0.153
Outer-regional area	0.091	0.074	0.109	0.105
Remote/very remote area	0.021	0.018	0.023	0.024
New South Wales	0.358	0.361	0.394	0.299
Victoria	0.293	0.285	0.263	0.354
Queensland	0.178	0.201	0.137	0.181
Western Australia	0.066	0.063	0.069	0.071
South Australia	0.061	0.049	0.086	0.055
Tasmania	0.024	0.028	0.029	0.008
Australian Capital Territory	0.017	0.010	0.023	0.024
Northern Territory	0.003	0.003	0.000	0.008

(a) Comprised mostly other familial relations, including grandchildren, in-laws and uncles/aunts.

Sample representativeness

Table 2 compares the characteristics of the estimation sample across residents, informal carers and providers to averages in national data and past surveys of older Australians. Since our sample excludes fully Commonwealth-supported residents, it is not directly comparable to national data and past surveys, which have included all aged care residents.

The resident sample's overall age distribution was younger than for all people in residential aged care in national data. There was an over-representation of residents aged between 65 and 84 years and an under-representation of residents aged 90 years and above. The sample's younger age distribution may be due to the sampling method, with older informal carers and their residents potentially less likely to engage with online surveying (Bethlehem, 2010). We estimate the influence of resident age on accommodation payment choice in the baseline estimations and sensitivity analyses to explore whether this is a potentially important influence on payment choice.

The gender distribution of the estimation sample (34.8% male) was close to the distribution of residents in national data (33.5%) (Department of Health, 2020). Residents captured in the sample had a relatively higher socioeconomic status than those captured in other surveys. Around 69% of residents in the survey sample owned their residence before residential aged care entry, which is higher than the 57% of older Australians who reported owning a home in past ACFA consumer survey (Aged Care Financing Authority, 2018).

Furthermore, nearly 11% of residents in the sample owned additional residential property. The difference is likely due to the ACFA sample including fully Commonwealth-supported residents (Aged Care Financing Authority, 2018) compared to our study sample. The ACFA sample also had an over-representation of residents paying combination and DAP payments, relative to our sample and the average in national aged care data (Aged Care Financing Authority, 2020).

The average level of financial literacy in the informal carer sample (48% answering all Big Three questions correct), was higher than average financial literacy measured in the general working-age Australian population (43%) (Agnew et al., 2013). The average number of questions answered correctly for the sample was 2.3, comparable to financially literate people who reported planning for financial decisions in a general population study (Agnew et al., 2013).

The above-average level of financial literacy in our study sample may reflect a selection process. More educated or financially-literate family members may have nominated themselves or been nominated by family to help the resident navigate entry into aged care, which is often considered

complex, confusing, and stressful. It may also reflect self-selection of informal carers into the survey.

Facility postcodes in the data were mapped to states and territories and remoteness region. Most of the resident sample resided in facilities in New South Wales and Victoria. The regional and remoteness area distributions were broadly reflective of national data on aged care residents. There was some over-representation of outer-regional, remote and very remote areas, and under-representation of residents in Queensland, Western Australia and South Australia.

Table 2: Survey sample characteristics compared to national data and other Australian surveys (*N=581*)

	Survey data, sample average	**Averages in national data/other studies (source)**
Resident age group		*(Department of Health, 2020)*
<65	**2.4%**	**2.6%**
65-69	**4.7%**	**3.6%**
70-74	**10.5%**	**6.9%**
75-79	**14.1%**	**10.8%**
80-84	**22.4%**	**17.5%**
85-89	**23.9%**	**23.8%**
90+	**22.0%**	**34.6%**
Resident gender		
Male	**34.8%**	**33.5%** *(Department of Health, 2020)*
Resident situation		
Owned primary residence before residential aged care entry	**68.7%**	**57%** *(Aged Care Financing Authority, 2018)*
Informal carer assessed financial literacy		
All 'Big Three' questions correct	**48%**	**43%** *(Agnew et al., 2013)*
Number of 'Big Three' questions correct	**2.3**	**2.3** *(Agnew et al., 2013)*
Facility location		*(Department of Health, 2020):*
NSW	**35.8%**	**33.0%**
VIC	**29.3%**	**26.5%**
QLD	**17.8%**	**19.2%**
WA	**6.6%**	**8.6%**
SA	**6.1%**	**8.8%**
TAS	**2.4%**	**2.4%**
ACT	**1.7%**	**1.2%**
NT	**0.3%**	**0.3%**
Major cities	**69.9%**	**70.5%**
Inner regional	**18.9%**	**21.6%**
Outer regional	**9.1%**	**7.4%**
Remote	**1.4%**	**0.4%**
Very remote	**0.7%**	**0.1%**

Methods

The associations between resident, informal carer and provider characteristics and the accommodation payment decision were modelled using two separate estimations. The first estimation explored characteristics associated with the discrete payment type chosen (between a RAD, DAP or combination payment), while the second estimation explored the association between these characteristics and the proportion RAD chosen within the accommodation payment (ranging from $0-1$ depending on payment type). Different model specifications were used, based on the outcome measure under investigation and to ensure the robustness of study conclusions to modelling assumptions.

Multinomial logistic regression to model decision between three payment types

We used multinomial logistic regression to estimate associations between observed resident, informal carer and provider characteristics and the decision between the three distinct payment types (RAD, DAP, combination) (Long, 1997). We assume the observed payment type (j) for individual i is linked to a latent variable, the utility derived from this payment type (U_{ij}), under a utility maximisation framework.

Under this framework and in the context of perfect information, an optimising individual is assumed to choose the payment type giving the highest estimated utility, subject to constraints. Let C (observed payment choice) denote a random variable taking on the value j= {1, 2, 3} to indicate which payment type was chosen. Payment type j would be chosen by individual i if:

$$P_{ij} = P\left\{U_{ij} + \varepsilon_{ij} \geq U_{ik} + \varepsilon_{ik}\right\} \text{ for all j} \neq \text{k}$$

Due to decision complexity and informal carer and provider level influences on decision-making, the observed payment type chosen may not be utility-maximising for the resident. We use X to denote the set of conditioning variables in the estimation associated with the payment decision. Besides observed resident characteristics, X also includes informal carer and provider characteristics to assess whether these groups also potentially influenced the payment decision.[1] The full list of covariates is presented in **Appendix Section A1**.

The probability that individual i will select alternative j (1, 2, or 3) is:

$$\mathrm{P}(C_i = j|\, X_i) = \frac{\exp(\beta_j X_i)}{1+\sum_{j=1}^{3}\exp(\beta_j X_i)} \quad \ldots\ldots\ldots\ldots\ldots\ldots \text{(i)}$$

Probabilities of choosing each alternative sum up to 1, i.e. $\sum_{j=1}^{3} P_{ij} = 1$. The multinomial logit model was estimated via maximum likelihood estimation, as the density of C given X is fully specified. DAP was chosen as the base option, with its coefficients normalised to zero for the estimation. The β coefficients were estimated for the RAD (1) and combination payment (3) choices, to capture average differences in the probability of choosing these payment types relative to DAP across different resident, informal carer and provider characteristics.

These β coefficients were converted to j sets of average marginal effects; percentage point increases/decreases in the likelihood of choosing RAD, DAP or combination payment with the presence of certain resident, informal carer and provider characteristics, while holding all other characteristics in X constant:

[1] Within X, we indirectly explored the influence of housing price levels through facility location in higher-priced states (NSW, Victoria and Queensland).

$$\frac{\partial P_{ij}}{\partial X_i} = P_{ij}\,(\beta_j - \bar{\beta}_\iota)$$

The multinomial logit model, however, assumes the relatively restrictive behavioural property of the 'independence of irrelevant alternatives (IIA)', where the relative probabilities of two alternatives in the model do not depend on the characteristics of the other alternatives (Freese and Long, 2000). The IIA property holds in models in which the errors are independently and identically distributed across alternatives. The IIA assumption would be violated if removing one of the payment types (RAD, DAP, combination) disproportionately affected the likelihood of choosing the other two types.

We tested the IIA assumption in our data using the Hausman test and seemingly unrelated estimation (suest)-based Hausman test (Hausman and McFadden, 1984). The results of these tests supported that the IIA property holds in the sample data using the specified dependent and independent variables. However, the reliability of the Hausman test and other tests of the IIA has been critiqued in past studies (Fry and Harris, 1996; Vijverberg, 2011). For this reason, and due to the potential for IIA to be behaviourally violated within this decision context, we alternatively modelled the payment accommodation payment through fractional logistic regression to ensure more robust study conclusions.

Fractional logistic regression to analyse RAD proportion

We alternatively estimated the impact of resident, informal carer and provider characteristics on the *proportion* of RAD (Y) within the accommodation payment, where $0 \leq Y \leq 1$. Within this estimation, we assume the observed RAD proportion chosen within the payment is linked to the unobserved utility associated with the choice of this proportion. Within this model, $Y = 1$ indicates RAD choice, $Y = 0$ indicates DAP choice and $0 < Y < 1$ indicates combination payment choice. Due to the fractional nature of the dependent variable, we undertook estimation using fractional logistic (logit) regression (Papke and Wooldridge, 1996) to model the conditional expectation of Y:

$$\mathrm{E}\,(Y_i \mid X_i) = G(\beta_i X_i) \quad \text{..... (ii)}$$

X denotes the set of selected resident, informal carer and provider characteristics, and $G(z)$ is the logistic cumulative distribution function, $G(z) = exp(z)/[1+exp(z)]$, used as a link function to ensure predicted values of Y fall within the unit interval (0,1). The β coefficients estimated capture average differences in RAD proportion chosen in the accommodation payment across different resident, informal carer and provider characteristics.

Equation (ii) is well-defined even if Y takes on the extreme value of 0 or 1 with positive probability (Papke and Wooldridge, 1996). The equation was estimated through quasi-likelihood estimation, which does not require knowledge of the true model distribution to obtain consistent parameter estimates. The only information required is the correct specification of the conditional mean. Robust standard errors were estimated, as the model makes no assumptions about the distribution of unobserved components. Fractional logit regression was chosen over beta regression due to its capability to handle the extreme values of 0 (DAP) and 1 (RAD) in the payment choice (Baum, 2008; Mullahy, 2010).

The β coefficients in the fractional regression were converted to average marginal effects; percentage point increases/decreases in proportion RAD in the accommodation payment with the presence of certain resident, informal carer and provider characteristics, while holding all other characteristics in X constant.

Sensitivity analysis: estimation using an imputed sample

The estimation sample consisted of 550 informal carers in the fractional logistic regression and 581 informal carers in the multinomial logistic regression, with no missing data for the two outcome variables and all covariates of interest. An additional 88 to 97 informal carers respectively were partial survey completers who had information available for all but seven covariates across these two estimations. Missing data for these covariates ranged from 16-21% of the sample.

To analyse whether excluding informal carers that did not complete the survey in full may have impacted our baseline results, we undertook sensitivity analyses by imputing missing values, adding this sample back, and performing all estimations with the larger sample (detailed in **Appendix Section A2**). Values for these missing variables were imputed using predictive mean matching with 10 nearest neighbours, and averaging across five imputations (Bailey et al., 2020). Predictive mean matching was chosen over parametric imputation, due to its greater flexibility (less modelling assumptions) and the ability to replace missing values with values as expected (categorical, continuous, etc.).

Results

Marginal effects from the multinomial and fractional logistic regressions are presented in **Table 3** with model coefficients included in **Appendix Tables A3-A4**. The estimation results suggest select resident, informal carer and provider characteristics are all significantly associated with the accommodation payment decision and that all three parties potentially influence the payment decision. We describe these significant associations, and the potential reasons behind these in the sections following.

Resident characteristics

Our results suggest that a resident's care circumstances before entering aged care potentially influence the payment decision. A resident with a partner or child left at home had a significantly higher likelihood of choosing a DAP (13.1 percentage point increase), and relatedly, a significantly lower RAD proportion within a combination payment (13.2 percentage point decrease). Similarly, a resident moving to the facility from a hospital was significantly more likely to choose a DAP payment (9.6 percentage point increase), and had a decreased RAD proportion within their combination accommodation payment (8.4 percentage point decrease), relative to those who had not moved from hospital.

Resident financial situation was significantly associated with the payment decision. Owning one property increased the proportion of RAD in the combined accommodation payment by 13.4 percentage points, while owning more than one property increased the RAD proportion by 14.0 percentage points. Residents on government income support before aged care entry had a 10.4 percentage point higher likelihood of DAP payment, and 12.1 percentage point reduced RAD proportion within their payment, than residents not on support.

Residents who were partially Commonwealth-supported for the accommodation payment had a 13.9 percentage point higher likelihood of DAP payment, and an 18.5 percentage point reduced RAD proportion within their payment, relative to non-supported residents.

These results align with the predictions of the theoretical (utility maximisation) framework, which suggests the payment decision is constrained by resident access to funding at the time of payment (from income and asset holdings and care circumstances). Greater access to funds is required to finance higher RAD proportions within the accommodation payment, hence 'lower means' residents were constrained from this payment option. Having a partner or child at home or moving from hospital may limit the ability to sell property and pay a RAD.

Informal carer characteristics

Our results suggest the informal carer's characteristics potentially influence the accommodation payment decision. Informal carer age was positively associated with a higher likelihood of combination payment. However, informal carer age was not associated with the specific proportion of RAD chosen within the payment.

English-speaking background was associated with an 18.2 percentage point higher likelihood of DAP payment choice and an 18.7 percentage point reduced RAD proportion in a combination payment, relative to informal carers from non-English speaking backgrounds.

Other informal carer characteristics, including educational attainment, appetite for investment risk, help-seeking, and perception of the decision-making process, were all associated with the accommodation payment decision.

Informal carers who reported taking substantial or above-average investment risks were significantly more likely to report RAD payment for the resident (9.5 percentage point increase) and significantly less likely report DAP payment (7.8 percentage point decrease). These carers also had a 7.9 percentage point increased RAD proportion within the accommodation payments, relative to informal carers who did not take investment risks.

Financial advisor use was also significantly associated with accommodation payment decision. If a financial advisor was used by the informal carer, there was a greater likelihood of RAD payment and reduced likelihood of DAP payment (an 8.5 percentage point reduction) for the resident. There was also a 7.7 per cent increased RAD proportion within the payment, compared to informal carers who did not consult advisors.

Around 35% of informal carers reported using a financial advisor when making the accommodation payment decision (Table 1) and 87% reported following the financial advice given. The association between use of professional financial advisor and RAD payment may suggest RADs are the best financial choice for a large proportion of aged care residents.

However, since RAD payment may entail leftover funds after house sale to be invested elsewhere, financial advisors may be incentivised to suggest this payment type if they can make a commission on future investment advice. This may suggest a potential moral hazard problem, as past research has found a link between commission-based incentive schemes and conflict of interest between advisors and clients (Robinson, 2007; Steen et al., 2016).

Emotive perceptions of the decision-making process reported by informal carers were significantly associated with the payment decision. Informal carers were less likely to find the decision complex with RAD payment, but higher RAD proportions in the payment were associated with greater reported stress.

Overall, the estimation results suggest informal carer involvement in the decision-making process as an agent potentially influences the payment decision, either directly or indirectly. A possibility is informal carers using decision-simplifying heuristics that have a bias towards a certain payment type, due to the substantial complexity associated with decision-making. This is indicated by the link between emotive characteristics and the payment decision. It is not possible to ascertain whether informal carers are acting in the best interests of the resident as decision-making agents.

Provider characteristics

Our results suggest that provider characteristics potentially influence the accommodation payment choice, including provider preferences for payment type. Overall, provider preference for a payment type was associated with an 11.3 percentage point higher likelihood of RAD payment, 11.5

percentage point lower likelihood of DAP payment and 12.4 percentage point increased RAD proportion in the payment.

These results suggest a potential principal-agent relationship may exist. Providers are often compelled to attract more RADs. A new resident may replace a resident that had paid a RAD used for capital expenditure, or the provider may be seeking to expand their capital expenditure with a new RAD.

Facility location was also significantly associated with accommodation payment choice. Residents in facilities in NSW, Victoria and Queensland had a 10.3 percentage point increased likelihood of RAD payment and a 11.9 percentage reduced likelihood of DAP payment. They also had a 12 percentage point increased RAD proportion within their payment. These states generally have higher housing prices given they contain the three largest cities in Australia. This increases the ability of residents to choose a RAD, and encourages facilities to move into these states. Past provider and consumer survey had found that the use of RADs is related to the state of the housing market and that residents are often unwilling to sell their homes to and finance RADs when house prices are falling (Aged Care Financing Authority, 2020).

Sensitivity analysis results using larger estimation sample

We performed a sensitivity analysis with a larger estimation sample of 638 and 678 informal carers with values imputed for missing covariates, to investigate whether non-random partial survey completion may have influenced findings. The model coefficients for the full and imputed sample estimations are presented side-by-side in **Appendix Tables A3-A4.** The direction, size and significance of these model coefficients is similar across both the baseline and imputed samples, suggesting that our study findings are robust to the impact of non-random partial survey completion. The only covariates that lose significance ($p \geq 0.1$) in the multinomial logistic regression comparing RAD to DAP are 'having a partner or child at home', 'owning more than 1 residential property' and informal carer English-speaking background. However, having a 'partner or child at home' is still significant, with a similar coefficient, in the fractional logistic regression using the imputed estimation sample. Overall, the imputed sample estimation results do not change our conclusions regarding the major resident, informal carer and provider-level potential drivers of the accommodation payment decision.

Discussion and conclusions

Choosing an accommodation payment type when entering residential aged care in Australia is a complex financial decision that is subject to the potentially competing interests of residents, their family members and aged care providers. Our study offers new insights on what factors may drive this end-of-life financial decision within a utility maximisation framework. Understanding the drivers of this decision is important, as the payment type chosen can substantially impact aged care residents' consumption and wealth levels, and aged care providers' ability to undertake capital expenditure to meet future demand.

We explored the influence of resident, informal carer and provider characteristics by analysing data from 581 informal carers who acted as an agent to help residents choose an accommodation payment type. Our results confirmed that a resident's financial situation and care circumstances constrain the ability to choose RAD or part-RAD payments, by influencing access to funds required when entering care or by influencing means tests determining pension income and aged care fees. The significant associations between resident financial situation and payment type align with findings from a recent study using administrative data on accommodation payments (Cutler et al, 2021a).

Table 3: Average marginal effects

	(i) Multinomial logit estimation – payment choice[a]						*(ii) Fractional logistic regression[b]*	
	[1] RAD		*[2] DAP*		*[3] Combination payment*		*Proportion RAD in payment*	
	Marginal effect	***p-value***	***Marginal effect***	***p-value***	***Marginal effect***	***p-value***	***Marginal effect***	***p-value***
Resident characteristics								
Age *(for 1 s.d. increase)*	0.024	0.296	-0.028	0.122	0.003	0.878	0.030	0.125
Male	-0.057	0.180	0.019	0.621	0.038	0.335	-0.032	0.408
Single	0.017	0.783	-0.024	0.675	0.006	0.915	0.019	0.731
Partner or child left at home	-0.081	0.267	**0.131***	**0.062**	-0.051	0.405	**-0.132***	**0.051**
Moved from a hospital to facility	-0.061	0.125	**0.096****	**0.010**	-0.034	0.309	**-0.084****	**0.024**
Owned residence prior to entering residential aged care	0.048	0.379	**-0.139*****	**0.004**	**0.091****	**0.032**	**0.134*****	**0.006**
Owned >1 residential properties	-0.019	0.828	**-0.165*****	**0.001**	**0.184****	**0.042**	**0.140****	**0.018**
Received government income support prior to residential aged care	**-0.143*****	**0.002**	**0.104*****	**0.008**	0.039	0.294	**-0.121*****	**0.002**
Commonwealth-supported for accommodation	**-0.178*****	**0.000**	**0.139*****	**0.000**	0.038	0.289	**-0.185*****	**0.000**
Informal carer characteristics								
Age (*for 1 s.d. increase)*	-0.020	0.356	-0.030	0.106	**0.050****	**0.013**	0.013	0.511
Male	0.018	0.669	0.015	0.702	-0.033	0.335	-0.005	0.894
English-speaking	**-0.186***	**0.053**	**0.182*****	**0.003**	0.005	0.959	**-0.187****	**0.010**
Child of resident	0.006	0.879	**-0.078*****	**0.039**	**0.071****	**0.034**	0.046	0.218
Highest educational attainment (reference: tertiary degree)								
- Year 12 or below	-0.018	0.737	0.016	0.743	0.003	0.957	-0.010	0.830
- Certificate/diploma	0.076	0.100	-0.055	0.195	-0.021	0.592	**0.073***	**0.086**
Financial literacy (all Big Three questions correct)	-0.051	0.213	0.050	0.188	0.001	0.967	-0.042	0.258
Carer reports taking above average/substantial investment risks	**0.095***	**0.051**	**-0.078***	**0.062**	-0.017	0.687	**0.079***	**0.063**
Reported factors considered in decision-making:								
Access to cash	-0.016	0.699	-0.014	0.694	0.030	0.395	-0.005	0.889
Access to assets	-0.061	0.169	0.053	0.191	0.008	0.833	-0.048	0.219
Impact on resident wealth	-0.062	0.180	**0.104****	**0.014**	-0.041	0.281	**-0.096****	**0.026**
Interest rate	-0.049	0.450	0.021	0.703	0.028	0.612	-0.040	0.499
Resident's expected length of stay	-0.063	0.173	0.023	0.578	0.040	0.326	-0.025	0.538
Home inheritance concerns	-0.009	0.821	0.046	0.211	-0.037	0.299	-0.027	0.455

Impact on other residential aged care fees	-0.038	0.372	-0.013	0.736	0.050	0.161	-0.003	0.933
Not wanting to have an outstanding debt	0.065	0.169	-0.025	0.527	-0.040	0.306	0.057	0.169
Perception of the decision-making process:								
Understood decision - difference between RAD and DAP	0.029	0.619	-0.006	0.908	-0.023	0.664	0.011	0.825
Found the decision complex	**-0.113****	**0.019**	0.059	0.131	0.053	0.233	**-0.087****	**0.030**
Found the decision stressful	0.021	0.657	**-0.090****	**0.025**	0.069	0.116	**0.072***	**0.074**
Sources of help used to assist decision-making:								
Consulted financial advisor	**0.080***	**0.068**	**-0.085****	**0.026**	0.004	0.909	**0.077****	**0.045**
Consulted online information	0.027	0.552	0.019	0.638	-0.047	0.267	-0.006	0.890
Provider characteristics								
Facility expressed payment type preference	**0.113*****	**0.004**	**-0.115*****	**0.001**	0.002	0.963	**0.124*****	**0.001**
Informed carer about 28-day decision-making period	-0.064	0.134	0.034	0.372	0.031	0.410	-0.055	0.146
Facility - Remoteness-region (reference: remote/very remote):								
Metro area	0.097	0.481	-0.045	0.657	-0.053	0.691	0.053	0.607
Inner-regional area	0.164	0.249	-0.048	0.657	-0.117	0.395	0.070	0.523
Outer-regional area	0.013	0.930	0.000	0.999	-0.013	0.925	-0.026	0.826
Facility – State (reference: all other states):								
Facility located in New South Wales, Victoria or Queensland	**0.103***	**0.050**	**-0.119****	**0.024**	0.015	0.743	**0.120****	**0.017**

(a) Percentage point increase/decrease in likelihood of payment choice
(b) Percentage point increase/decrease in proportion RAD in payment
p<0.1, p<0.05**, p<0.01****

However, we found new evidence of informal carer characteristics and provider preferences being associated with payment type chosen and the RAD proportion within payments, indicating these parties directly or indirectly influence the accommodation payment decision. These findings suggest informal carer characteristics and provider interests may inhibit the optimum accommodation payment being chosen.

The significant associations between informal carer characteristics and payment type may reflect informal carers influencing the decision to maximise their own utility by influencing resident asset holdings. Our study could not determine whether this was evident because we did not measure whether decisions were directly influenced by the informal carer for their own gain, or whether the accommodation payment type chosen was not optimal for the resident. Evidence on whether informal carers act out of altruistic (Altonji et al., 1997; Perozek, 1998; Sloan et al., 1997) or strategic bequest (Berheim, 1991; Horioka et al., 2017; Johar et al., 2015) motives is mixed across countries and more research is needed for the Australian aged care context.

However, our results do suggest that informal carers may bias the choice by using decision-simplifying heuristics when helping residents choose an accommodation payment type (DellaVigna, 2009; Gabaix et al., 2006), due to the substantial complexity associated with the decision itself. This complexity is indicated by significant associations between carer-perceived decision stress and complexity and choosing specific payment types.

While residential aged care providers have a legislated obligation to remain neutral in the accommodation decision process, we found evidence that provider payment preferences were significantly associated with RAD payment. This may suggest undue provider influence on the decision, through a potential principal-agent relationship, particularly since many providers are heavily reliant on RADs to remain solvent and to fund capital expenditure.

The significant association between provider preferences and RAD payment may reflect recent uncertainty in the financial environment faced by providers, with some fearing a reversal of payment preferences toward DAP and shrinking of the RAD payment pool in future (Aged Care Financing Authority, 2020). Our findings of provider financial interests potentially influencing aged care decisions align with those of a past Australian study. Hamilton and Menezes (2011) found limited residential aged care payment options in the past, including an inability to charge RADs to 'high care' residents, created provider financial incentives to discriminate against certain resident types in favour of attracting residents who could pay a RAD.

Another significant association found in our study was between reported financial advisor use and a RAD payment. This may suggest that RADs are the best financial option for a large proportion of aged care residents. However, it may also suggest a potential moral hazard problem, as RAD payment often results in residual funds leftover to be invested. Financial advisors could potentially make a commission from giving investment advice on the leftover funds. Past studies have found that commission-based compensation models can create an inherent conflict of interest between advisors and clients (Robinson, 2007; Steen et al., 2016). More research would be needed to explore the association between RAD payment and financial advisor use and the reasons behind it.

Provider influence on decision-making may be a target for government policy. Without intervention, capital funding pressures and a continued shift in resident preferences to DAP payments (Abiona et al., 2020) may further encourage providers to influence accommodation payment decision-making. Government intervention could encompass measures to ensure providers remain neutral in the decision-making process and strict requirements to be transparent and provide adequate and easy-to-understand information around legal timeframes for payment decisions.

Other tangential government policies may relate to alleviating financial pressures and uncertainty related to providers' capital financing and care funding environment to avoid providers unduly influencing payment decisions as a result. This could include increasing capital grants to providers, guaranteeing commercial debt given to providers by banks, or developing a loan facility for providers as recommended by the recent Royal Commission into Aged Care Quality and Safety (Cutler et al., 2021a).

Our results suggest all aged care residents are not equally placed when it comes to choosing an accommodation payment type. Financial situation and care circumstances limit the ability to choose a RAD payment, with residents holding less assets or moving from hospital into residential care substantially less likely to choose a RAD payment. This may relate to the timeframe for RAD payment of six months. While there is potential for policy to increase payment and decision-making time frames, this must be balanced against the potential funding uncertainty created for providers from longer timeframes.

Optimising the accommodation payment decision is highly complex. While the payment decision is constrained by resident financial situation, the decision itself influences resident income and assets, through its impact on means-testing considerations (the budget constraint is not fixed in the utility maximisation framework). Optimisation may be a big ask for informal carers and residents. Despite the informal carer sample being highly educated, nearly 60% still reported the accommodation payment decision being complex and 54% found the decision stressful, which is indicative of this decision complexity.

Overall, decision complexity and potential provider and informal carer influence reduces the likelihood that optimal payment decisions are made from a resident's perspective. The Australian Government could consider simplifying the accommodation payment decision by removing refundable accommodation deposits as a payment option, instead introducing a purely rent-based system to pay for accommodation.

Another option may be to introduce an intermediary between residents and providers to hold RADs and provide low cost loans to fund capital expenditure to providers. An intermediary would reduce the incentive for providers to influence the resident's payment decision, while still allowing residents to pay using a RAD. This could also reduce decision complexity and increase decision confidence for residents, given that providers expressing a payment type preference negatively impact these decision characteristics (Cutler et al., 2021).

Our study was subject to several limitations. Due to the cross-sectional nature of our survey, we explored significant associations in our analyses, rather than strict causality. While the survey was detailed in variables, there may be other, unobserved characteristics that influence the accommodation payment decision that we were not able to account for, which may create omitted variable bias.

The covariates measuring resident financial situation were limited as these were proxies for residents being of low means (having either low income or asset levels and qualifying for government support). Hence, we were unable to estimate the association between specific income and asset amounts and payment type. Due to the unique nature of the target study population, informal carers acting as decision agents, the sample size was also relatively small, giving us less ability to detect statistical significance, particularly for multi-category covariates.

Our descriptive statistics indicate that residents captured in our sample were relatively younger than the national residential aged care population, and informal carers had higher financial literacy than the general population. More educated or financially-literate family members may have nominated themselves or been nominated by family to help the resident navigate entry into aged care. This may also reflect some self-selection of informal carers into the online survey, with more

financially literate individuals more likely to participate. The descriptive statistics and sample averages are therefore not generalisable to characteristics of the general residential aged care population.

Overall, there is a need for more research on accommodation payments and whether RADs are an appropriate financing mechanism. Future research is needed to support interventions that address existing shortcomings in decision-making processes and align resident, informal carer and provider incentives.

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Appendix

Section A1: Covariates included in estimations

Table A1: Full list of covariates used in estimation equations

Covariate:	*Measure*
Resident characteristics	
Age	years
Male	0/1
Single	0/1
Partner or child left at home	0/1
Moved from a hospital to facility	0/1
Owned residence prior to RAC	0/1
Owned >1 residential properties	0/1
Received government income support prior to residential aged care	0/1
Commonwealth-supported for accommodation	*0/1*
Informal carer characteristics	
Age	years
Male	0/1
English-speaking	0/1
Child of resident	0/1
Highest educational attainment (reference: tertiary degree)	
Year 12 or below	0/1
Certificate/diploma	0/1
Financial literacy and risk-taking	
All 'Big Three' questions correct	0/1
Decision-maker reports taking above average/substantial investment risks	0/1
Reported factors considered in decision-making:	
Access to cash	0/1
Access to assets	0/1
Impact on resident wealth	0/1
Interest rate	0/1
Resident's expected length of stay	0/1
Home inheritance concerns	0/1
Impact on other residential aged care fees	0/1
Not wanting to have an outstanding debt	0/1
Perception of decision-making process:	
Understood decision - difference between RAD and DAP	0/1
Found the decision complex	0/1
Found the decision stressful	0/1
Sources of help used to assist decision-making:	
Consulted financial advisor	0/1
Consulted online information	0/1
Provider characteristics	
Facility expressed payment type preference	0/1
Aged care informed decision-maker about 28-day decision-making period	0/1
Facility - Remoteness-region (reference: remote/very remote):	
Metro area	0/1
Inner-regional area	0/1
Outer-regional area	0/1
Facility – State (reference: all other states):	
Facility located in New South Wales, Victoria or Queensland	0/1

Section A2: Sensitivity analysis using larger estimation sample and imputed data

For our baseline estimations, we had a sample size of 550 informal carers for the fractional logistic regression analysing RAD proportions, and 581 informal carers for the multinomial logistic regression analysing the choice between a RAD, DAP or combination payment. Larger samples of 638 and 678 informal carers had data for all but seven covariates (i.e. they were partial survey completers) for the fractional logistic and multinomial logistic regressions, respectively. Missing data percentages for these seven covariates are listed in **Table A2** and ranged from 16.2% to 21.0%.

Table A2: Covariates with missing data in larger estimation sample

Covariate:	***% sample with missing data***
Resident characteristics	
Single	16.2%
Partner or child left at home	16.2%
Owned residence prior to RAC	18.0%
Owned >1 residential properties	18.0%
Received government income support prior to residential aged care	16.2%
Informal carer characteristics	
Financial literacy and risk-taking	
All 'Big Three' questions correct	21.0%
Decision-maker reports taking above average/substantial investment risks	21.0%

Univariate regressions indicated that the probability of missing data for these variables was significantly associated with residents and informal carers being of older age, informal carers being female and informal carers having low educational attainment (Year 12 or less).

We imputed values for these missing variables using predictive mean matching with 10 nearest neighbours, and averaging across five imputations (Bailey et al., 2020). Predictive mean matching was chosen over parametric imputation, due to its greater flexibility (less modelling assumptions) and the ability to replace missing values with values as expected (categorical, continuous, etc.).

The larger estimation sample with imputed values was analysed using the multinomial and fraction logistic regression analyses investigating accommodation payment choice and RAD proportion in accommodation payment. Model coefficients using this larger sample broadly align with the size and significance of the baseline model coefficients, suggesting the study findings are robust to the effects of non-random partial survey completion (**Table A3-A4**).

None of the characteristics associated with survey drop-out (age, gender and educational attainment) were significantly associated with the outcome variables (accommodation payment type, proportion RAD) in either the baseline or sensitivity analyses.

Table A3: Model coefficients for the baseline and imputed samples – multinomial logit estimation

Outcome variable:	*Choice of RAD (relative to DAP base option)*					
	Baseline sample (N=581)			*Imputed sample (N=678)*		
Covariates	*Coeff.*	*Robust s.e.*	*p-value*	*Coeff.*	*Robust s.e.*	*p-value*
Resident characteristics						
Age	0.021	0.014	0.132	0.014	0.013	0.300
Male	-0.227	0.240	0.344	-0.238	0.224	0.287
Single	0.142	0.340	0.677	0.297	0.311	0.340
Partner or child left at home	**-0.703***	**0.399**	**0.078**	-0.507	0.372	0.173
Moved from a hospital to facility	**-0.545****	**0.226**	**0.016**	**-0.571*****	**0.207**	**0.006**
Owned residence prior to RAC	**0.663****	**0.294**	**0.024**	**0.540***	**0.277**	**0.052**
Owned >1 residential properties	**0.849***	**0.463**	**0.067**	0.467	0.426	0.274
Received government income support prior to residential aged care	**-0.790*****	**0.262**	**0.003**	**-0.752*****	**0.259**	**0.004**
Commonwealth-supported for accommodation	**-1.010*****	**0.241**	**0.000**	**-1.058*****	**0.229**	**0.000**
Informal carer characteristics						
Age	0.008	0.013	0.519	0.012	0.013	0.350
Male	-0.017	0.248	0.945	-0.090	0.231	0.697
English-speaking	**-1.475****	**0.643**	**0.022**	-0.892	0.565	0.115
Child of resident	0.342	0.238	0.151	0.254	0.217	0.240
Highest educational attainment (reference: tertiary degree)						
- Year 12 or below	-0.111	0.301	0.712	-0.119	0.271	0.660
- Certificate/diploma	0.425	0.268	0.113	0.264	0.247	0.285
Financial literacy (all Big Three questions correct)	-0.340	0.244	0.164	-0.273	0.267	0.313
Carer reports taking above average/substantial investment risks	**0.578****	**0.282**	**0.041**	**0.558****	**0.278**	**0.046**
Reported factors considered in decision-making:						
Access to cash	0.021	0.227	0.927	-0.008	0.206	0.968
Access to assets	-0.374	0.252	0.138	-0.345	0.225	0.125
Impact on resident wealth	**-0.576****	**0.262**	**0.028**	**-0.489****	**0.240**	**0.041**
Interest rate	-0.214	0.354	0.545	0.120	0.322	0.710
Resident's expected length of stay	-0.260	0.263	0.323	-0.254	0.243	0.296
Home inheritance concerns	-0.216	0.229	0.347	-0.141	0.209	0.500
Impact on other residential aged care fees	-0.040	0.237	0.865	-0.187	0.218	0.391
Not wanting to have an outstanding debt	0.269	0.262	0.304	0.269	0.240	0.262
Perception of the decision-making process:						
Understood decision - difference between RAD and DAP	0.099	0.323	0.759	0.005	0.308	0.986
Found the decision complex	**-0.530****	**0.253**	**0.036**	**-0.431***	**0.230**	**0.060**
Found the decision stressful	**0.430****	**0.255**	**0.092**	**0.443***	**0.232**	**0.056**
Sources of help used to assist decision-making:						
Consulted financial advisor	**0.569****	**0.253**	**0.024**	**0.542****	**0.224**	**0.016**
Consulted online information	-0.013	0.262	0.960	-0.031	0.239	0.896
Provider characteristics						
Facility expressed payment type preference	**0.768*****	**0.231**	**0.001**	**0.654*****	**0.210**	**0.002**
Aged care informed carer about 28-day decision-making period	-0.306	0.243	0.208	-0.139	0.219	0.524
Facility - Remoteness-region (reference: remote/very remote):						
Metro area	0.433	0.652	0.507	0.304	0.655	0.643
Inner-regional area	0.615	0.691	0.373	0.433	0.688	0.529
Outer-regional area	0.034	0.739	0.964	0.113	0.726	0.877
Facility – State (reference: all other states):						
Facility located in New South Wales, Victoria or Queensland	**0.730****	**0.305**	**0.017**	**0.648****	**0.282**	**0.021**
Intercept	-0.666	1.438	0.643	-0.638	1.345	0.635

Outcome variable:	*Choice of combination payment (relative to DAP base option)*					
	Baseline sample (N=581)			*Imputed sample (N=678)*		
Covariates	*Coeff.*	*Robust s.e.*	*p-value*	*Coeff.*	*Robust s.e.*	*p-value*
Resident characteristics						
Age	0.016	0.018	0.361	0.013	0.016	0.419
Male	0.104	0.293	0.723	0.056	0.265	0.832
Single	0.130	0.445	0.771	0.263	0.429	0.540
Partner or child left at home	-0.760	0.496	0.125	-0.361	0.480	0.453
Moved from a hospital to facility	**-0.564****	**0.269**	**0.036**	**-0.638*****	**0.242**	**0.008**
Owned residence prior to RAC	**1.033*****	**0.350**	**0.003**	**0.864****	**0.352**	**0.016**
Owned >1 residential properties	**1.611*****	**0.533**	**0.002**	**1.096****	**0.491**	**0.026**
Received government income support prior to residential aged care	-0.256	0.295	0.385	-0.183	0.295	0.536
Commonwealth-supported for accommodation	-0.409	0.281	0.145	-0.432	0.264	0.102
Informal carer characteristics						
Age	**0.037****	**0.015**	**0.012**	**0.035*****	**0.014**	**0.009**
Male	-0.232	0.280	0.408	-0.207	0.263	0.431
English-speaking	-1.043	0.781	0.181	-0.346	0.725	0.633
Child of resident	**0.678****	**0.269**	**0.012**	**0.634****	**0.247**	**0.010**
Highest educational attainment (reference: tertiary degree)						
- Year 12 or below	-0.053	0.350	0.879	-0.012	0.312	0.969
- Certificate/diploma	0.127	0.312	0.684	0.074	0.283	0.792
Financial literacy (all Big Three questions correct)	-0.204	0.266	0.444	-0.180	0.313	0.570
Carer reports taking above average/substantial investment risks	0.265	0.344	0.441	0.240	0.371	0.521
Reported factors considered in decision-making:						
Access to cash	0.206	0.266	0.439	0.384	0.238	0.106
Access to assets	-0.179	0.293	0.541	-0.183	0.259	0.479
Impact on resident wealth	**-0.628****	**0.302**	**0.038**	**-0.582****	**0.277**	**0.036**
Interest rate	0.047	0.384	0.902	0.298	0.357	0.404
Resident's expected length of stay	0.096	0.298	0.748	0.176	0.273	0.520
Home inheritance concerns	-0.377	0.277	0.174	-0.194	0.249	0.434
Impact on other residential aged care fees	0.302	0.276	0.273	0.208	0.248	0.401
Not wanting to have an outstanding debt	-0.098	0.311	0.752	-0.268	0.294	0.362
Perception of the decision-making process:						
Understood decision - difference between RAD and DAP	-0.085	0.382	0.824	-0.072	0.360	0.841
Found the decision complex	0.014	0.336	0.968	0.177	0.301	0.556
Found the decision stressful	**0.723****	**0.325**	**0.026**	**0.642****	**0.287**	**0.025**
Sources of help used to assist decision-making:						
Consulted financial advisor	0.392	0.298	0.189	**0.562****	**0.265**	**0.034**
Consulted online information	-0.305	0.310	0.325	-0.465	0.282	0.100
Provider characteristics						
Facility expressed payment type preference	**0.494***	**0.265**	**0.062**	0.341	0.241	0.157
Aged care informed carer about 28-day decision-making period	0.009	0.288	0.976	0.061	0.254	0.812
Facility - Remoteness-region (reference: remote/very remote):						
Metro area	-0.072	0.888	0.935	-0.142	0.884	0.873
Inner-regional area	-0.376	0.935	0.687	-0.465	0.918	0.613
Outer-regional area	-0.064	0.961	0.947	-0.007	0.945	0.994
Facility – State (reference: all other states):						
Facility located in New South Wales, Victoria or Queensland	0.528	0.362	0.145	0.325	0.321	0.312
Intercept	**-3.787***	**1.990**	**0.057**	**-4.034****	**1.892**	**0.033**

p<0.1, p<0.05**, p<0.01****

Table A4: Model coefficients for the original and imputed samples –fractional logistic regression

Outcome variable:	*Proportion of RAD in the accommodation payment*					
	Baseline sample (N=550)			*Imputed sample (N=638)*		
Covariates	***Coeff.***	***Robust s.e.***	***p-value***	***Coeff.***	***Robust s.e.***	***p-value***
Resident characteristics						
Age	0.018	0.012	0.131	0.011	0.011	0.306
Male	-0.164	0.197	0.406	-0.167	0.184	0.365
Single	0.097	0.280	0.729	0.212	0.255	0.405
Partner or child left at home	**-0.656****	**0.332**	**0.048**	**-0.512***	**0.303**	**0.091**
Moved from a hospital to facility	**-0.424****	**0.186**	**0.023**	**-0.439*****	**0.169**	**0.009**
Owned residence prior to RAC	**0.675*****	**0.247**	**0.006**	**0.581****	**0.236**	**0.014**
Owned >1 residential properties	**0.772****	**0.359**	**0.031**	0.469	0.347	0.177
Received government income support prior to residential aged care	**-0.619*****	**0.209**	**0.003**	**-0.603*****	**0.210**	**0.005**
Commonwealth-supported for accommodation	**-0.928*****	**0.197**	**0.000**	**-0.950*****	**0.185**	**0.000**
Informal carer characteristics						
Age	0.007	0.011	0.514	0.011	0.010	0.299
Male	-0.027	0.202	0.894	-0.086	0.187	0.645
English-speaking	**-1.088****	**0.504**	**0.031**	-0.670	0.463	0.148
Child of resident	0.237	0.194	0.221	0.175	0.177	0.324
Highest educational attainment (reference: tertiary degree)						
- Year 12 or below	-0.053	0.247	0.830	-0.079	0.221	0.722
- Certificate/diploma	0.375*	0.220	0.088	0.209	0.203	0.304
Financial literacy (all Big Three questions correct)	-0.217	0.194	0.262	-0.176	0.212	0.412
Carer reports taking above average/substantial investment risks	**0.411***	**0.226**	**0.068**	**0.407***	**0.223**	**0.069**
Reported factors considered in decision-making:						
Access to cash	-0.026	0.185	0.889	-0.034	0.166	0.838
Access to assets	-0.248	0.202	0.220	-0.228	0.180	0.205
Impact on resident wealth	**-0.485****	**0.219**	**0.027**	**-0.406****	**0.201**	**0.043**
Interest rate	-0.202	0.296	0.495	0.105	0.265	0.690
Resident's expected length of stay	-0.129	0.209	0.536	-0.143	0.194	0.462
Home inheritance concerns	-0.141	0.189	0.456	-0.097	0.171	0.568
Impact on other residential aged care fees	-0.016	0.195	0.933	-0.144	0.179	0.421
Not wanting to have an outstanding debt	0.295	0.218	0.176	0.290	0.200	0.147
Perception of the decision-making process:						
Understood decision - difference between RAD and DAP	0.058	0.263	0.825	-0.013	0.254	0.960
Found the decision complex	**-0.454****	**0.214**	**0.034**	**-0.358***	**0.193**	**0.064**
Found the decision stressful	**0.373***	**0.212**	**0.078**	**0.361***	**0.192**	**0.060**
Sources of help used to assist decision-making:						
Consulted financial advisor	**0.400***	**0.203**	**0.048**	**0.389****	**0.179**	**0.030**
Consulted online information	-0.030	0.214	0.890	-0.059	0.195	0.762
Provider characteristics						
Facility expressed payment type preference	**0.637*****	**0.187**	**0.001**	**0.546*****	**0.171**	**0.001**
Aged care informed carer about 28-day decision-making period	-0.285	0.198	0.150	-0.157	0.179	0.382
Facility - Remoteness-region (reference: remote/very remote):						
Metro area	0.275	0.536	0.608	0.168	0.537	0.754
Inner-regional area	0.362	0.569	0.524	0.240	0.566	0.672
Outer-regional area	-0.132	0.600	0.826	-0.042	0.593	0.944
Facility – State (reference: all other states):						
Facility located in New South Wales, Victoria or Queensland	**0.603****	**0.253**	**0.017**	**0.501****	**0.235**	**0.033**
Intercept	-0.626	1.248	0.616	-0.506	1.179	0.668

p<0.1, p<0.05**, p<0.01****